

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34623.1.1 (R-4430)	1	10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. 34623.1.1 F.A. PROJ. STP-1783(1)
COUNTY HENDERSON
PROJECT DESCRIPTION SR 1783 FROM US-176 TO SR-1006

SITE DESCRIPTION BRIDGE NO. 255 ON SR-1783 OVER
BAT FORK CREEK

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

T.B. DANIEL

C.J. COFFEY

L.E. LANKFORD

INVESTIGATED BY P.Q. LOCKAMY

CHECKED BY W.D. FRYE JR.

SUBMITTED BY W.D. FRYE JR.

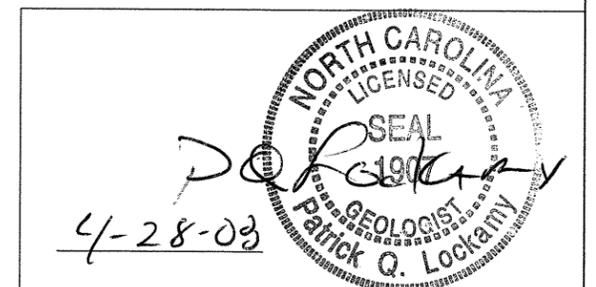
DATE 04.24.08

PROJECT: 34623.1.1
ID: R-4430

DRAWN BY: J.T. WILLIAMS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

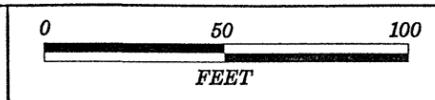


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																				
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>	<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>CORE RECOVERY (REC) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																				
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th><th>A-3</th><th>A-2</th><th>A-2</th><th>A-2</th><th>A-2</th><th>A-2</th> <th>A-4</th><th>A-5</th><th>A-6</th><th>A-7</th><th>A-7</th><th>A-7</th><th>A-7</th><th>A-7</th> <th>A-1, A-2</th><th>A-4, A-5</th><th>A-6, A-7</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1-a</th><th>A-1-b</th><th>A-2-4</th><th>A-2-5</th><th>A-2-6</th><th>A-2-7</th> <th>A-4</th><th>A-5</th><th>A-6</th><th>A-7-6</th><th>A-7-6</th><th>A-7-6</th><th>A-7-6</th><th>A-7-6</th> <th>A-1, A-2</th><th>A-4, A-5</th><th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td> </tr> <tr> <th>% PASSING</th> <td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td> <td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td> <td>6</td><td>6</td><td>6</td> </tr> <tr> <th>PLASTIC INDEX</th> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL AND SAND</td><td>FINE SAND</td><td>SILTY OR CLAYEY GRAVEL AND SAND</td><td>SILTY GRAVEL AND SAND</td><td>SILTY SOILS</td><td>CLAYEY SOILS</td> <td>GRANULAR SOILS</td><td>SILT-CLAY SOILS</td><td>MUCK, PEAT</td><td colspan="4"></td><td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td><td>HIGHLY ORGANIC SOILS</td><td colspan="2"></td> </tr> <tr> <th>GENERAL RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td><td colspan="3">FAIR TO POOR</td><td>FAIR TO POOR</td><td>POOR</td><td>UNSATISFACTORY</td><td colspan="7"></td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS			A-1	A-3	A-2	A-2	A-2	A-2	A-2	A-4	A-5	A-6	A-7	A-7	A-7	A-7	A-7	A-1, A-2	A-4, A-5	A-6, A-7	GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7-6	A-7-6	A-7-6	A-7-6	A-7-6	A-1, A-2	A-4, A-5	A-6, A-7	SYMBOL																		% PASSING	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	LIQUID LIMIT	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	PLASTIC INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT					SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS			GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATISFACTORY								<p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>		GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD - CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS																																																																																																																																																																							
	A-1	A-3	A-2	A-2	A-2	A-2	A-2	A-4	A-5	A-6	A-7	A-7	A-7	A-7	A-7	A-1, A-2	A-4, A-5	A-6, A-7																																																																																																																																																																					
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7-6	A-7-6	A-7-6	A-7-6	A-7-6	A-1, A-2	A-4, A-5	A-6, A-7																																																																																																																																																																						
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LIQUID LIMIT	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6																																																																																																																																																																						
PLASTIC INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																																																																																																																																						
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT					SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS																																																																																																																																																																								
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SPACING</p> <p>VERY WIDE - MORE THAN 10 FEET</p> <p>WIDE - 3 TO 10 FEET</p> <p>MODERATELY CLOSE - 1 TO 3 FEET</p> <p>CLOSE - 0.16 TO 1 FEET</p> <p>VERY CLOSE - LESS THAN 0.16 FEET</p> <p style="text-align: center;">BEDDING</p> <p>VERY THICKLY BEDDED - > 4 FEET</p> <p>THICKLY BEDDED - 1.5 - 4 FEET</p> <p>THINLY BEDDED - 0.16 - 1.5 FEET</p> <p>VERY THINLY BEDDED - 0.03 - 0.16 FEET</p> <p>THICKLY LAMINATED - 0.008 - 0.03 FEET</p> <p>THINLY LAMINATED - < 0.008 FEET</p> <p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>	<p style="text-align: center;">TERMS AND DEFINITIONS</p> <p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>CORE RECOVERY (REC) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																						
NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																																																																																																					
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			<p style="text-align: center;">NOTES:</p> <p>BENCH MARK: BL-10 -L- STA. 64+23.34 50.19' RT</p> <p style="text-align: right;">ELEVATION: 2097.11 FT</p>																																																																																																																																																																																				



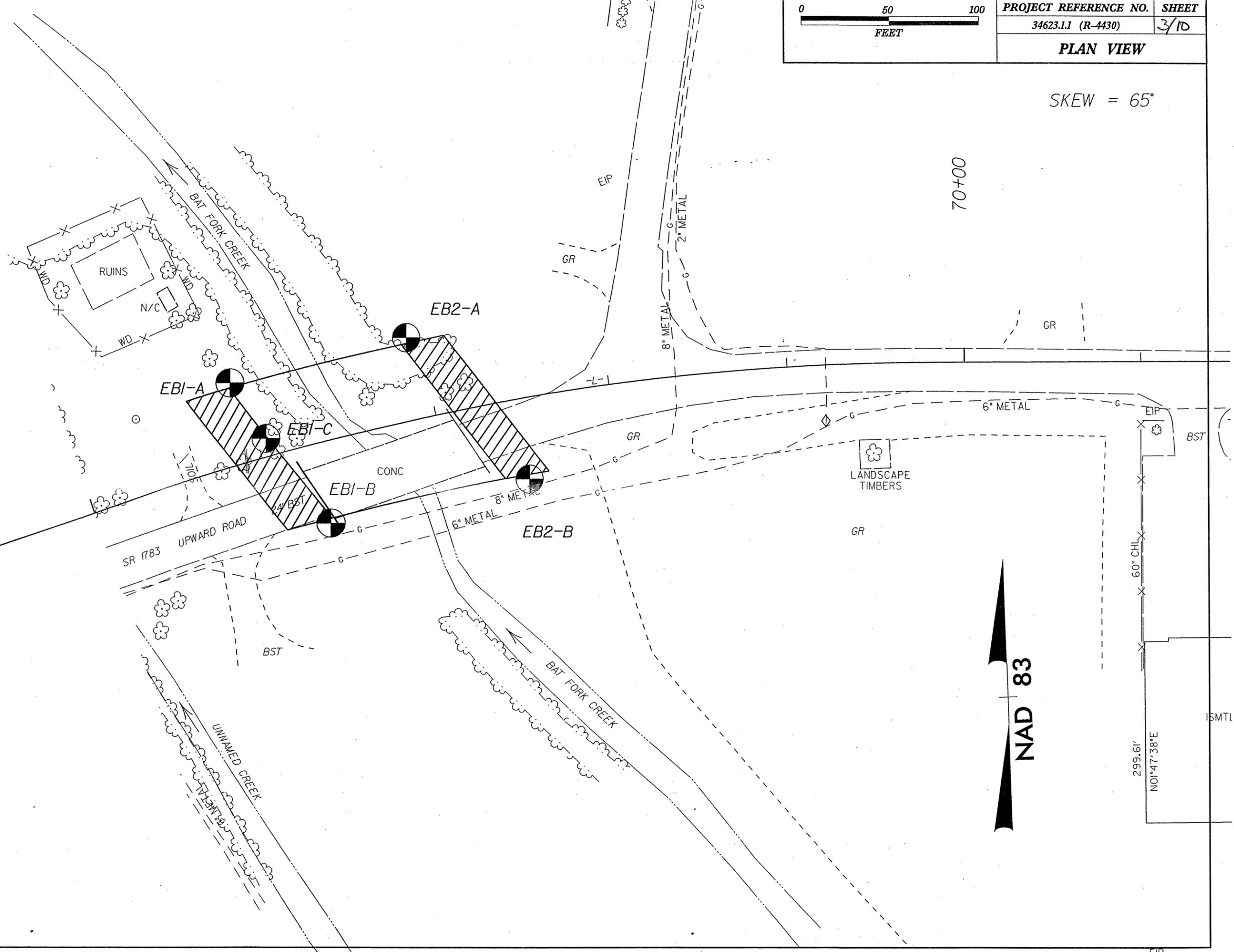
PROJECT REFERENCE NO.	SHEET
34623.1.1 (R-4430)	3/10

PLAN VIEW

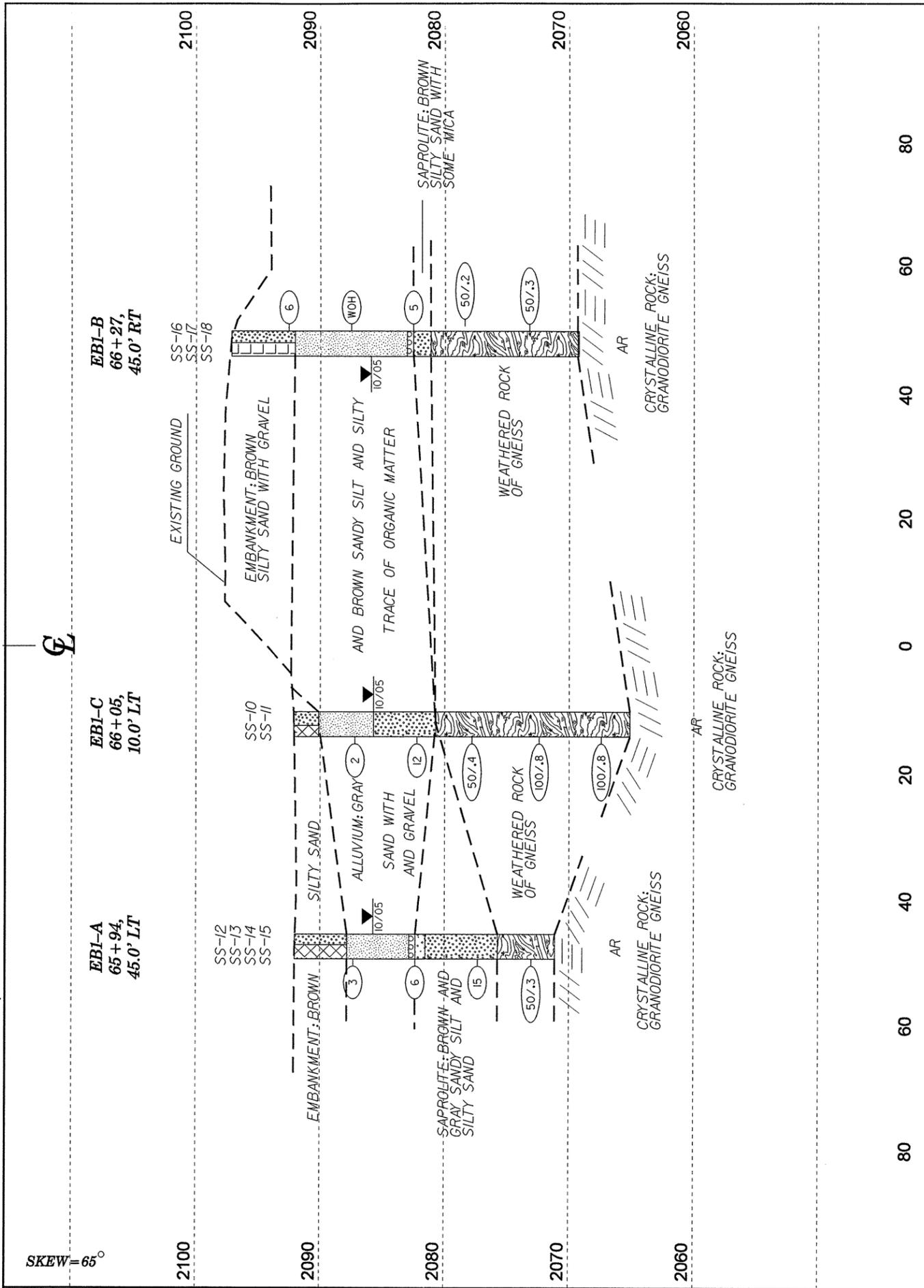
SKEW = 65°

65+00

70+00



\$FILE\$

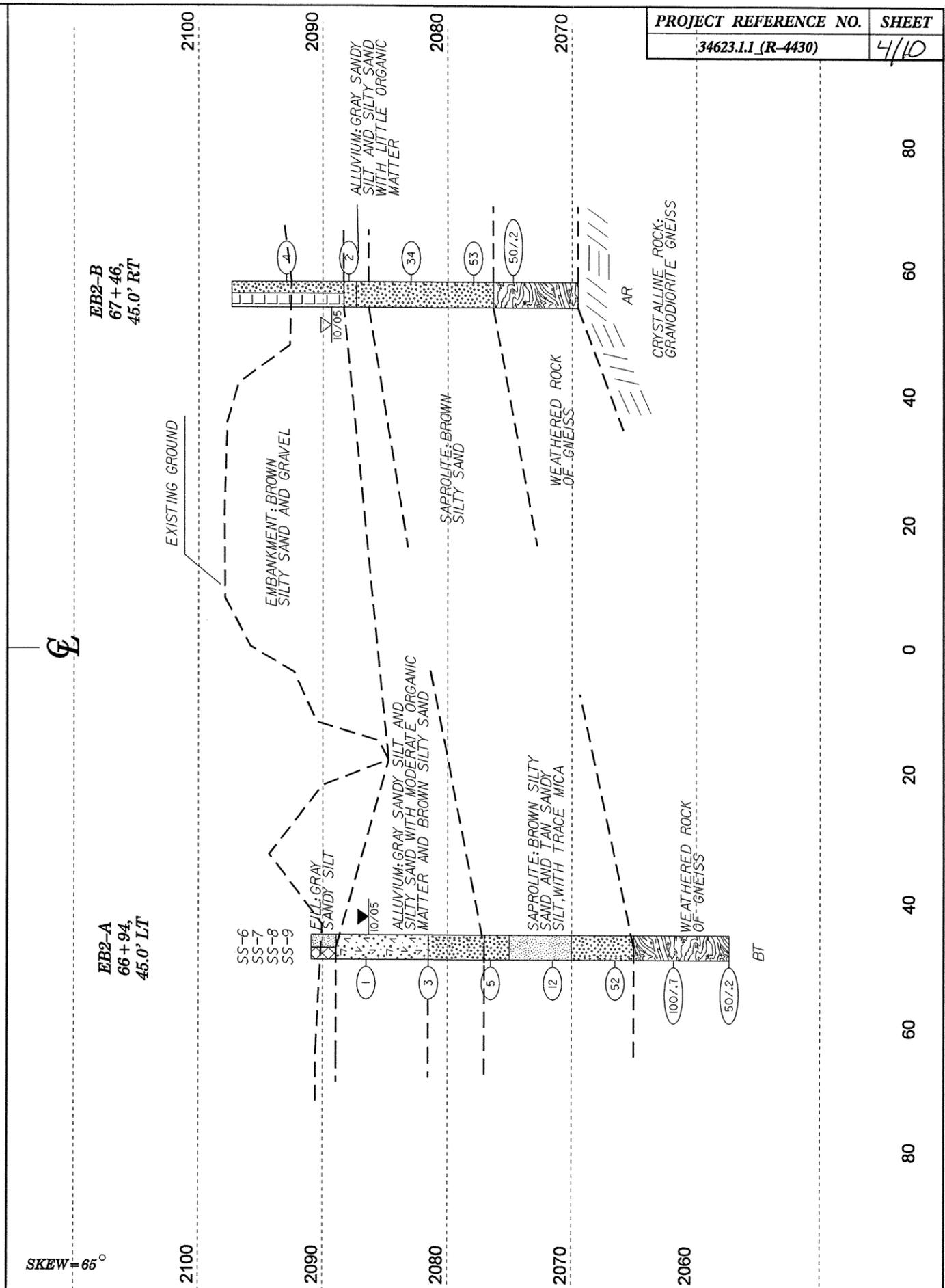


SKEW = 65°

HORIZ. SCALE 0 20 40 (FEET)

VE = 2

CROSS SECTION: END BENT ONE



SKEW = 65°

HORIZ. SCALE 0 20 40 (FEET)

VE = 2

CROSS SECTION: END BENT TWO

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.										
SITE DESCRIPTION Bridge No. 255 on SR-1783 over Bat Fork Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 65+94		OFFSET 45ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,092.0 ft		TOTAL DEPTH 20.9 ft		NORTHING 580,588		EASTING 980,844										
DRILL MACHINE CME-45		DRILL METHOD H.S.Augers		HAMMER TYPE Automatic												
START DATE 10/12/05		COMP. DATE 10/12/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 20.9 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2095														2,092.0	GROUND SURFACE	0.0
2090	2,088.3	3.7												2,087.8	ARTIFICIAL FILL Fill: Brown silty sand	4.2
2085	2,083.3	8.7	1	1	2									2,082.8	ALLUVIAL Alluvium: Gray sandy silt with trace of organic matter	9.2
2080	2,078.3	13.7	4	3	3									2,082.3	ALLUVIAL Alluvial gravel	9.7
2075	2,073.3	18.7	5	6	9									2,081.5	SAPROLITE Saprolite: Brown silty sand with mica	10.5
2070														2,075.8	SAPROLITE Saprolite: Gray silty sand with mica	16.2
2065														2,071.1	WEATHERED ROCK Weathered rock of gneiss	20.9
2060															Boring Terminated by Auger Refusal at Elevation 2,071.1 ft On Crystalline Rock	
2055																
2050																
2045																
2040																
2035																
2030																
2025																
2020																
2015																

NCDOT BORE SINGLE GINT BORELOGS.GPJ NC_DOT.GDT 04/17/08

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.										
SITE DESCRIPTION Bridge No. 255 on SR-1783 over Bat Fork Creek							GROUND WTR (ft)									
BORING NO. EB1-C		STATION 66+05		OFFSET 10ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,092.1 ft		TOTAL DEPTH 27.0 ft		NORTHING 580,557		EASTING 980,864										
DRILL MACHINE CME-45		DRILL METHOD H S Augers		HAMMER TYPE Automatic												
START DATE 10/18/05		COMP. DATE 10/18/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 27.0 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2095														2,092.1	GROUND SURFACE	0.0
2090	2,088.2	3.9												2,090.1	ARTIFICIAL FILL Fill: Brown silty sand	2.0
2085	2,083.2	8.9	1	1	1									2,085.7	ALLUVIAL Alluvium: Brown sandy silt with trace of organic matter	6.4
2080	2,078.2	13.9	2	6	6									2,080.7	ALLUVIAL Alluvium: Gray silty sand	11.4
2075														2,075.8	WEATHERED ROCK Weathered rock of gneiss	16.2
2070														2,071.1	Boring Terminated by Auger Refusal at Elevation 2,071.1 ft On Crystalline Rock	
2065														2,065.1	Boring Terminated by Auger Refusal at Elevation 2,065.1 ft On Crystalline Rock	
2060																
2055																
2050																
2045																
2040																
2035																
2030																
2025																
2020																
2015																

NCDOT BORE SINGLE GINT BORELOGS.GPJ NC_DOT.GDT 04/17/08

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.							
SITE DESCRIPTION Bridge No. 255 on SR-1783 over Bat Fork Creek							GROUND WTR (ft)						
BORING NO. EB2-A		STATION 66+94		OFFSET 45ft LT		ALIGNMENT -L-							
COLLAR ELEV. 2,090.9 ft		TOTAL DEPTH 33.6 ft		NORTHING 580,610		EASTING 980,946							
DRILL MACHINE CME-45		DRILL METHOD H S Augers		HAMMER TYPE Automatic									
START DATE 10/10/05		COMP. DATE 10/10/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 33.6 ft							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
2095													
2090													
	2,087.5	3.4											
2085			WOH	WOH	1								
	2,082.5	8.4											
2080			WOH	WOH	3								
	2,077.5	13.4											
2075			2	2	3								
	2,072.5	18.4											
2070			4	5	7								
	2,067.5	23.4											
2065			5	12	40								
	2,062.5	28.4											
2060			42	58/0.2									
	2,057.5	33.4											
2055			50/0.2										
2050													
2045													
2040													
2035													
2030													
2025													
2020													
2015													

NCDOT BORE SINGLE GINT BORELOGS.GPJ NC_DOT.GDT 04/17/08

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.							
SITE DESCRIPTION Bridge No. 255 on SR-1783 over Bat Fork Creek							GROUND WTR (ft)						
BORING NO. EB2-B		STATION 67+46		OFFSET 45ft RT		ALIGNMENT -L-							
COLLAR ELEV. 2,097.3 ft		TOTAL DEPTH 27.8 ft		NORTHING 580,530		EASTING 981,012							
DRILL MACHINE CME-45		DRILL METHOD H S Augers		HAMMER TYPE Automatic									
START DATE 10/18/05		COMP. DATE 10/18/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 27.8 ft							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
2100													
2095													
	2,093.9	3.4											
2090			2	2	2								
	2,088.9	8.4											
2085			1	1	1								
	2,083.9	13.4											
2080			7	13	21								
	2,078.9	18.4											
2075			13	17	36								
	2,073.9	23.4											
2070			50/0.2										
2065													
2060													
2055													
2050													
2045													
2040													
2035													
2030													
2025													
2020													

NCDOT BORE SINGLE GINT BORELOGS.GPJ NC_DOT.GDT 04/17/08

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.10.05	DATE RECEIVED:	10.12.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-1	SS-2	SS-3Q	SS-4	SS-5	SS-6	SS-7	SS-8
Lab Sample No. A	150747	150748	150749	150751	150752	150753	150754	150755
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	89	93	91	97	100	92	100	97
Passing #40 Sieve %	83	75	77	76	83	86	95	93
Passing #200 Sieve %	64	46	45	17	25	42	35	40

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	13	27	24	42	36	16	13	12
Fine Sand - Ret. #270	19	32	31	45	45	47	67	61
Silt 0.05-0.005 mm %	15	27	19	11	13	27	18	23
Clay < 0.005 mm %	53	14	26	2	6	10	2	4
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	53	29	32	36	33	41	39	38
Plastic Index	6	NP	4	NP	NP	NP	NP	NP
AASHTO Classification	A-5 (8)	A-4 (2)	A-4 (2)	A-2-4 (0)	A-2-4 (0)	A-5 (1)	A-2-4 (0)	A-4 (1)
Quantity								
Texture								
Station	19+50	19+50	26+50	26+50	72+00	66+94	66+94	66+94
Hole No.								
Depth (ft) From:	0.0	3.0	3.4	8.4	3.8	3.4	13.4	18.4
To:	3.0	8.4	4.9	9.9	5.3	4.9	14.9	19.9

Remarks:

A-150747 - 150755 ; Moisture Content for SS-3M = 20.1%

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

8/10

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1 (cont.)	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.10.05	DATE RECEIVED:	10.12.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-9							
Lab Sample No. A	150756							
HiCAMS Sample #	--							
Retained #4 Sieve %	--							
Passing #10 Sieve %	93							
Passing #40 Sieve %	78							
Passing #200 Sieve %	30							

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	29							
Fine Sand - Ret. #270	50							
Silt 0.05-0.005 mm %	17							
Clay < 0.005 mm %	4							
Passing # 40 Sieve %	--							
Passing # 200 Sieve %	--							

Liquid Limit	32							
Plastic Index	NP							
AASHTO Classification	A-2-4 (0)							
Quantity								
Texture								
Station	66+94							
Hole No.								
Depth (ft) From:	23.4							
To:	24.9							

Remarks:

A-150756

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.12.05	DATE RECEIVED:	10.13.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15		
Lab Sample No. A	150758	150760	150761	150762	150763	150764		
HiCAMS Sample #	--	--	--	--	--	--		
Retained #4 Sieve %	--	--	--	--	--	--		
Passing #10 Sieve %	88	72	91	70	99	87		
Passing #40 Sieve %	87	67	88	45	96	81		
Passing #200 Sieve %	61	23	54	8	37	32		

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	3	19	10	59	11	17		
Fine Sand - Ret. #270	37	62	38	32	69	59		
Silt 0.05-0.005 mm %	32	15	28	7	16	20		
Clay < 0.005 mm %	28	4	24	2	4	4		
Passing # 40 Sieve %	--	--	--	--	--	--		
Passing # 200 Sieve %	--	--	--	--	--	--		

Liquid Limit	37	30	29	20	43	30		
Plastic Index	8	NP	5	NP	NP	NP		
AASHTO Classification	A-4 (5)	A-2-4 (0)	A-4 (4)	A-1-b (0)	A-5 (0)	A-2-4 (0)		
Quantity								
Texture								
Station	66+27	66+27	65+94	65+94	65+94	65+94		
Hole No.								
Depth (ft) From:	8.6	18.6	8.7	9.2	9.7	13.7		
To:	10.1	23.9	9.2	9.7	10.2	15.2		

Remarks:
 A-150758 - 150764; Moisture Content for SS-10M = 28.6%

CC:
 C. A. Dunnagan
 File

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

9/10

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.19.05	DATE RECEIVED:	10.19.05	DATE REPORTED:	10.24.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-16	SS-17	SS-18	SS-19	SS-20		
Lab Sample No. A	150831	150832	150833	150834	150835		
HiCAMS Sample #	--	--	--	--	--		
Retained #4 Sieve %	--	--	--	--	--		
Passing #10 Sieve %	86	90	90	98	97		
Passing #40 Sieve %	76	81	82	92	89		
Passing #200 Sieve %	37	25	30	48	37		

MINUS #10 FRACTION

Soil Mortar - 100%							
Coarse Sand -Ret. #60	25	27	24	14	21		
Fine Sand - Ret. #270	39	50	52	47	52		
Silt 0.05-0.005 mm %	22	17	22	23	21		
Clay < 0.005 mm %	14	6	2	16	6		
Passing # 40 Sieve %	--	--	--	--	--		
Passing # 200 Sieve %	--	--	--	--	--		

Liquid Limit	29	24	28	35	33		
Plastic Index	NP	NP	NP	NP	NP		
AASHTO Classification	A-4 (0)	A-2-4 (0)	A-2-4 (0)	A-4 (3)	A-4 (0)		
Quantity							
Texture							
Station	EB1-C	EB1-C	EB1-C	6+00	6+00		
Hole No.							
Depth (ft) From:	3.9	8.9	13.9	3.6	8.6		
To:	5.4	10.4	14.5	5.1	10.1		

Remarks:
 A-150831 - 150835

CC:
 C. A. Dunnagan
 File

SOILS ENGINEER:



FIELD SCOUR REPORT

WBS: 34623.1.1 TIP: R-4430 COUNTY: Henderson

DESCRIPTION(1): Bridge No. 255 on SR-1783 over Bat Fork Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 255 Length: 90ft Total Bents: 4 Bents in Channel: 1 Bents in Floodplain 3
 Foundation Type: Steel "H" piles.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None noted.

Interior Bents: Minor amount around B2-B area.

Channel Bed: None noted.

Channel Bank: None noted.

EXISTING SCOUR PROTECTION

Type(3): Pile and panel end-bent walls.

Extent(4): 5 ft beyond bridge on either side.

Effectiveness(5): N/A

Obstructions(6): _____

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

10/10

Channel Bed Material(7): Silty sand.

Channel Bank Material(8): Silty sand.

Channel Bank Cover(9): Mostly grass with occasional shrubs and small trees.

Floodplain Width(10): Greater than 200 feet.

Floodplain Cover(11): Grass with a few small trees.

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): East at site of existing bridge.

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet _____ Meters _____

BENTS

	B1	B2	B3	B4									
SB Lanes, Lt													
SB Lanes, Rt													
NB Lanes, Lt													
NB Lanes, Rt													

Comparison of DSE to Hydraulics Unit theoretical scour:
 Hydraulics Unit theoretical scour does not involve proposed endbents.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank													
Sample No.													
Retained #4													
Passed #10													
Passed #40													
Passed #200													
Coarse Sand													
Fine Sand													
Silt													
Clay													
LL													
PI													
AASHTO													
Station													
Offset													
Depth													

Template Revised 02/07/06

Reported by: P.Q. Lockamy
 P.Q. Lockamy

Date: 4/18/2008

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34623.1.1 (R-4430)	1	19

STRUCTURE

CONTENTS:

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	PLAN VIEW
4	PROFILE
5-6	CROSS SECTIONS
7-11	BORE LOG & CORE REPORTS
12-13	SOIL TEST RESULTS
14-16	ROCK CORE TEST RESULTS
17-19	CORE PHOTOGRAPHS

SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34623.1.1 F.A. PROJ. R-4430
 COUNTY Henderson
 PROJECT DESCRIPTION SR-1783 form US-176 to SR-1006

SITE DESCRIPTION Bridge 162 on SR-1783
(Upward Rd) over -Y10- (I-26)

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

ID: R-4430

PROJECT: 34623.1.1

PERSONNEL

T B Daniel

C J Coffey

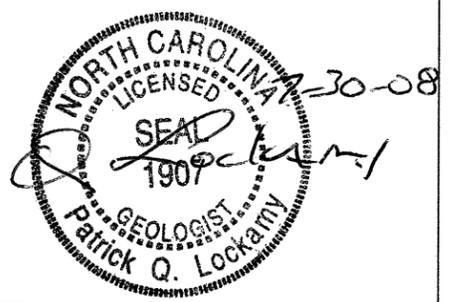
L E Lankford

INVESTIGATED BY PQ Lockamy

CHECKED BY W D Frye, Jr

SUBMITTED BY W D Frye, Jr

DATE JUNE 30, 2008



DRAWN BY: PQ LOCKAMY

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

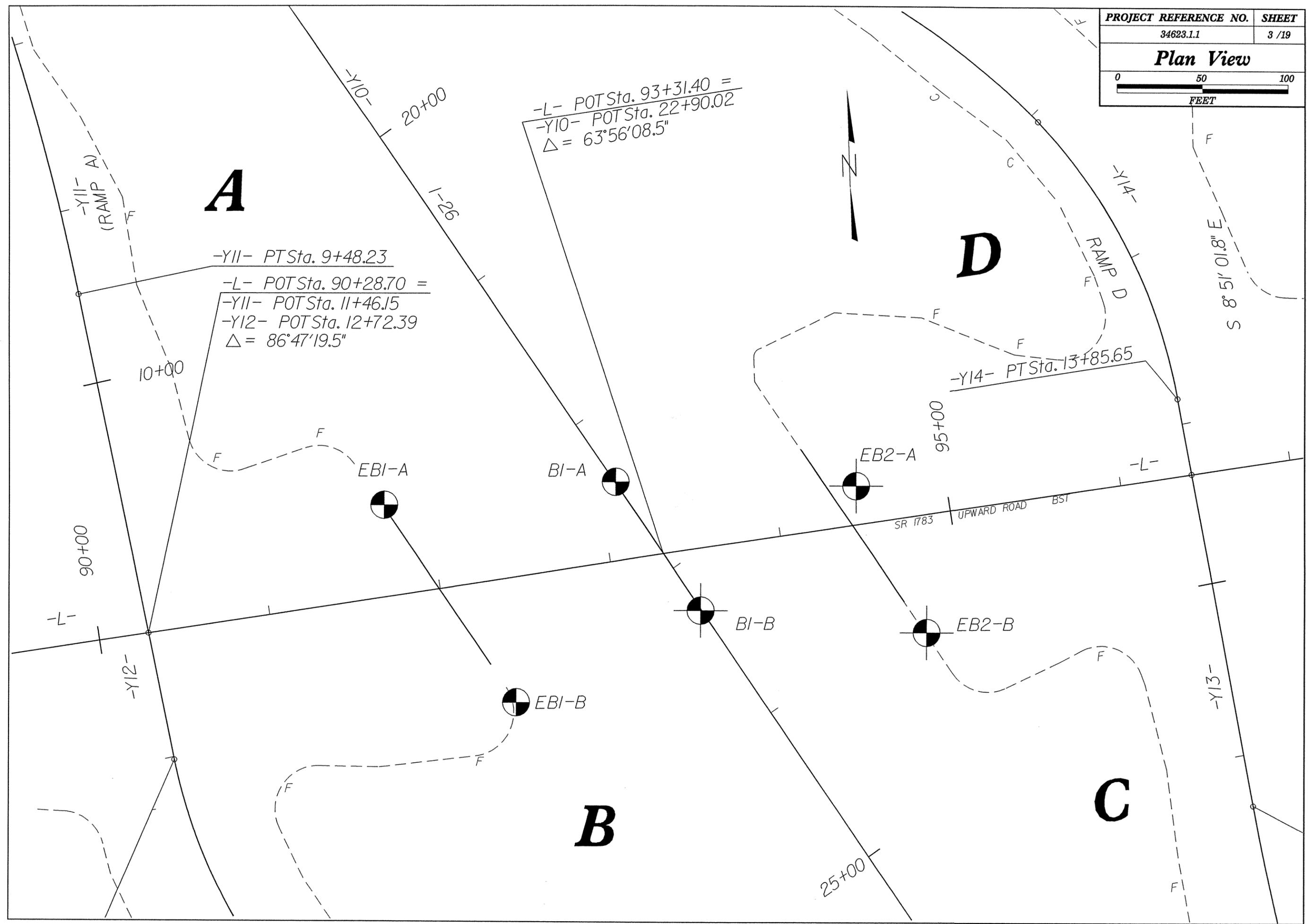
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

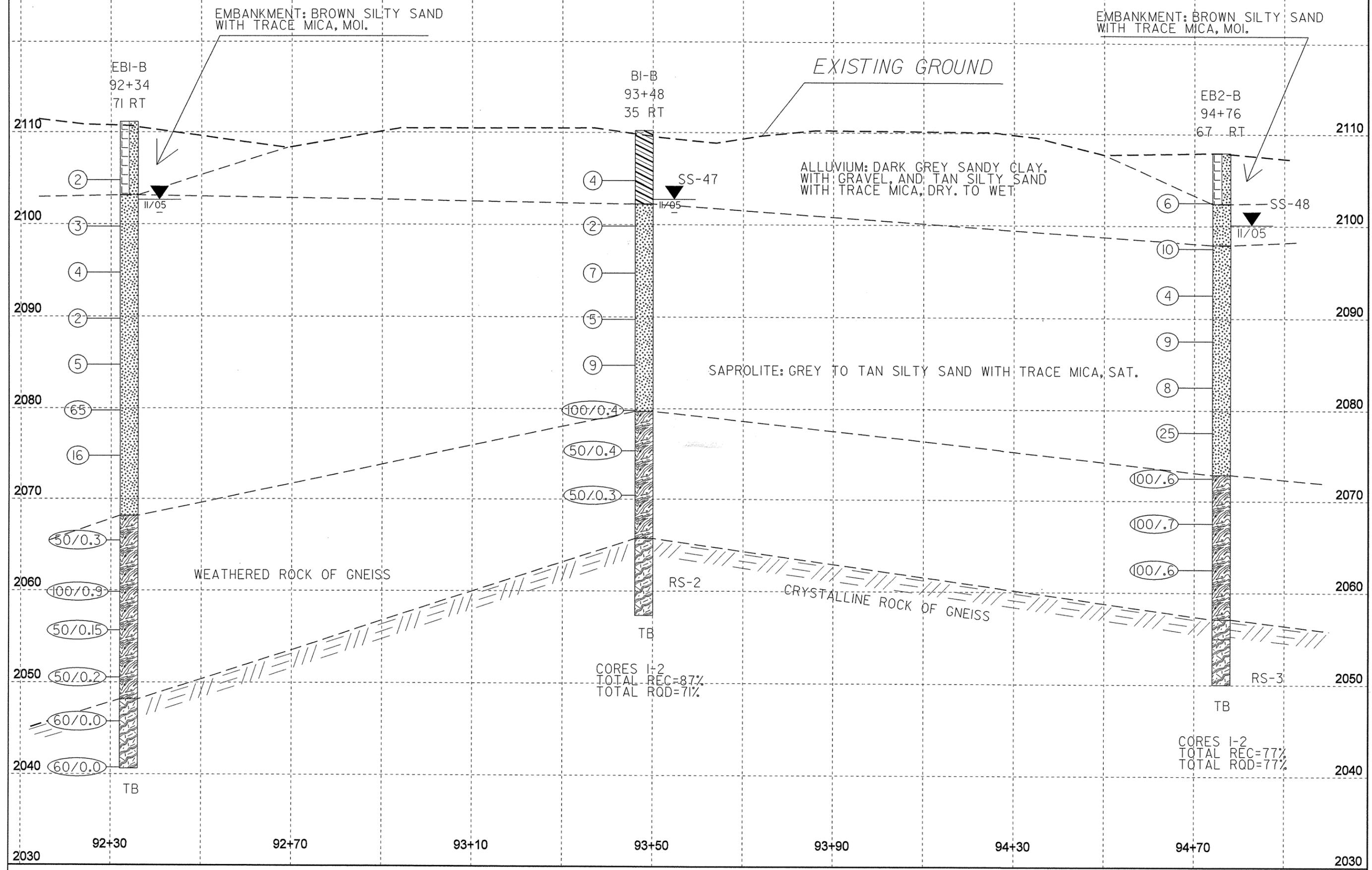
PROJECT REFERENCE NO. 34623.11 (R-4430)	SHEET NO. 2 / 19
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SUBSURFACE INVESTIGATION

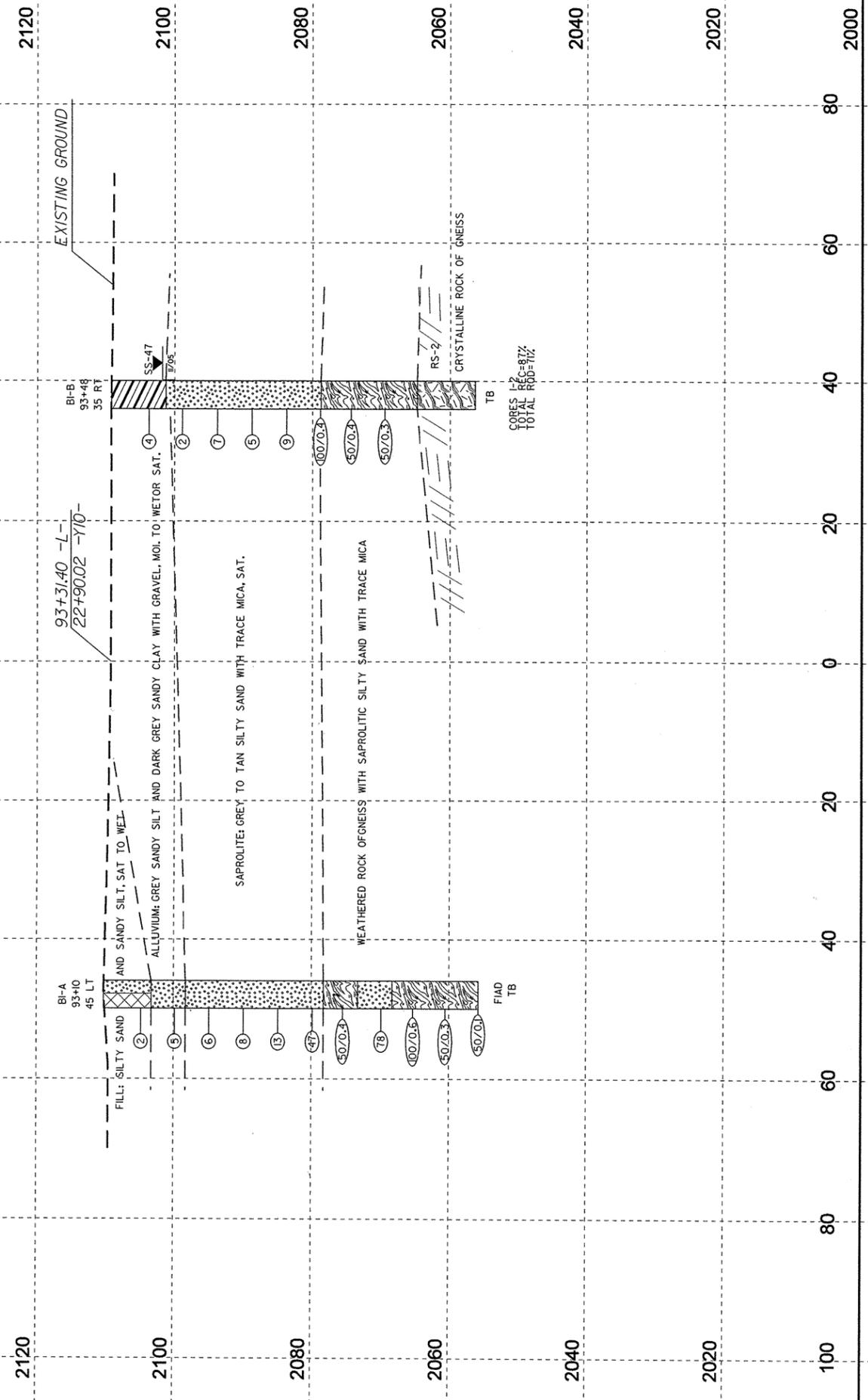
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE		
SYMBOL	PERCENTAGE OF MATERIAL		
% PASSING # 10, # 40, # 200	ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE		
LIQUID LIMIT PLASTIC INDEX	GROUND WATER		
GROUP INDEX	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		
USUAL TYPES OF MAJOR MATERIALS	MISCELLANEOUS SYMBOLS		
GEN. RATING AS A SUBGRADE	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD	SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL	
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	ABBREVIATIONS	ROCK HARDNESS	
CONSISTENCY OR DENSENESS	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	HL - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL	FRACTURE SPACING TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET	
GENERALY GRANULAR MATERIAL (NON-COHESIVE)	W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT	BEDDING TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
GENERALY SILT-CLAY MATERIAL (COHESIVE)	W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
TEXTURE OR GRAIN SIZE	EQUIPMENT USED ON SUBJECT PROJECT		
U.S. STD. SIEVE SIZE OPENING (MM) 4, 10, 40, 60, 200, 270	DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST		
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)	ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT		
GRAIN SIZE MM 305, 75, 2.0, 0.25, 0.05, 0.005	HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		
SOIL MOISTURE - CORRELATION OF TERMS			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION			
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT	- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		
PLASTICITY			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY			
COLOR			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			
		BENCH MARK: NCGS Bronze Disc "Upward 1974"	ELEVATION: 2131.02 FT.
		NOTES:	

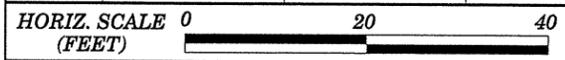
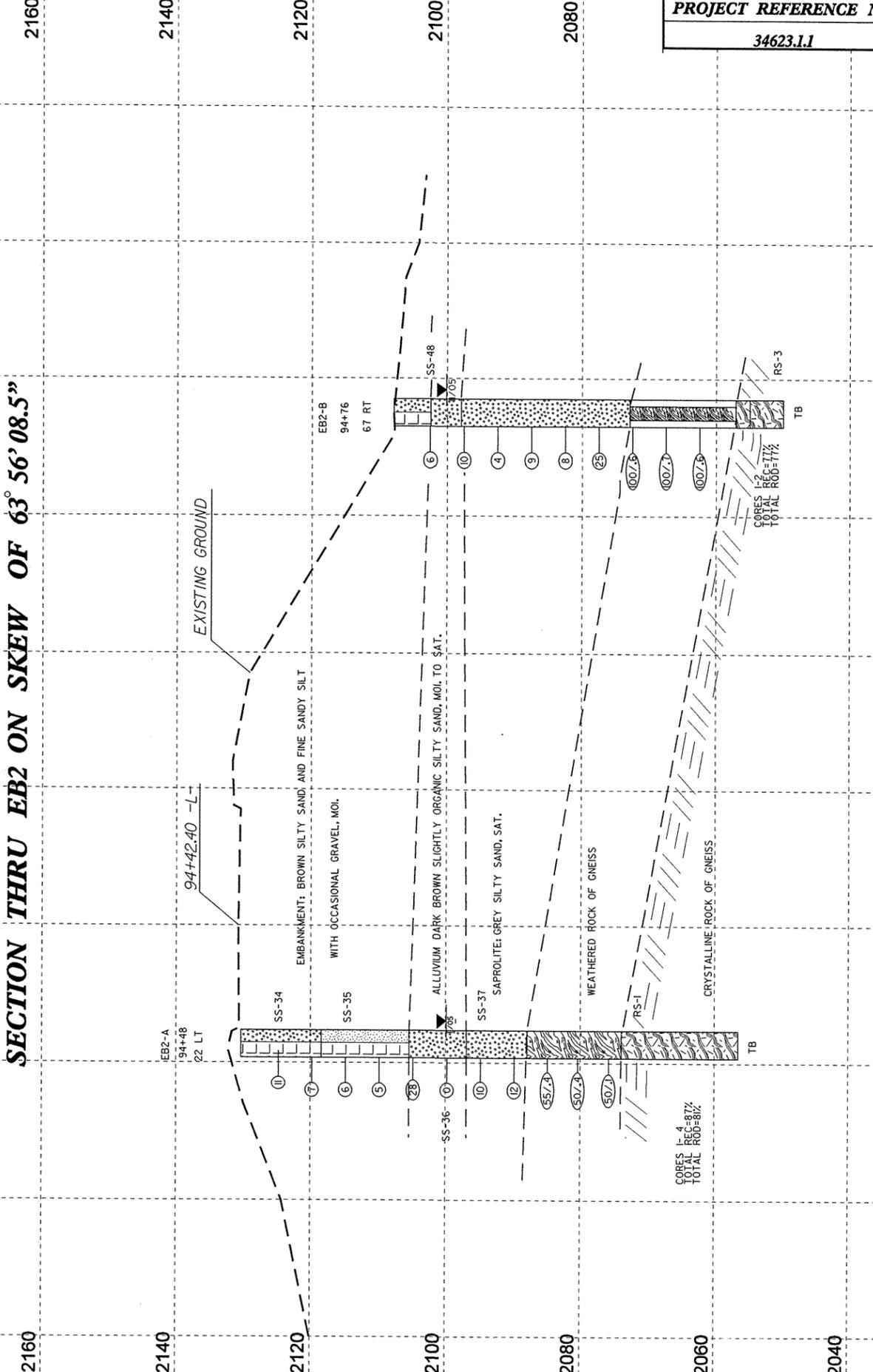




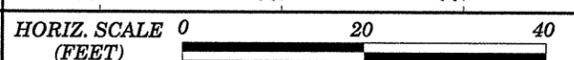
SECTION THRU BI ON SKEW OF 63° 56' 08.5"



SECTION THRU EB2 ON SKEW OF 63° 56' 08.5"



VE = 1



VE = 1

PROJECT NO. 34623.1.1	ID. R-4430	COUNTY Henderson	GEOLOGIST Daniel, T. B.
SITE DESCRIPTION BRIDGE 162 ON SR-1783 (UPWARD RD.) OVER I-26 (-Y10-)			GROUND WTR (ft)
BORING NO. B1-A	STATION 93+10	OFFSET 45ft LT	ALIGNMENT L
COLLAR ELEV. 2,110.2 ft	TOTAL DEPTH 54.5 ft	NORTHING 580,655	EASTING 983,559
DRILL MACHINE CME-550	DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic	
START DATE 11/09/05	COMP. DATE 11/09/05	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75				
2115												
2,110.2											GROUND SURFACE	0.0
2,105.8	4.4	4	1	1							FILL: SILTY SAND AND SANDY SILT, SAT TO WET	
2,100.8	9.4	0	1	4							ALLUVIUM: GREY SILTY SAND, SAT	7.0
2,095.8	14.4	4	4	2							SAPROLITE: TAN SILTY SAND WITH TRACE MICA, SAT	12.0
2,090.8	19.4	4	4	4								
2,085.8	24.4	5	9	4								
2,080.8	29.4	13	19	28								
2,075.8	34.4	50/0.4									WEATHERED ROCK OF GNEISS	32.0
2,070.8	39.4	32	41	37							SAPROLITE: BROWN SILTY SAND WITH TRACE MICA, MOI.	37.0
2,065.8	44.4	70	30/1								WEATHERED ROCK OF GNEISS	42.0
2,060.8	49.4	50/0.3										
2,055.8	54.4	50/0.1										
											Boring Terminated at Elevation 2,055.7 ft IN WEATHERED ROCK OF GNEISS	54.5

NCDOT BORE SINGLE R4430 GEO BRDG Y10_GPJ_NC_DOT_GDT 6/18/08

PROJECT NO. 34623.1.1	ID. R-4430	COUNTY Henderson	GEOLOGIST Daniel, T. B.
SITE DESCRIPTION BRIDGE 162 ON SR-1783 (UPWARD RD.) OVER I-26 (-Y10-)			GROUND WTR (ft)
BORING NO. B1-B	STATION 93+48	OFFSET 35ft RT	ALIGNMENT L
COLLAR ELEV. 2,109.3 ft	TOTAL DEPTH 52.9 ft	NORTHING 580,580	EASTING 983,606
DRILL MACHINE CME-550	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 11/08/05	COMP. DATE 11/09/05	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 44.5 ft

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2110												GROUND SURFACE	0.0
2,104.8	4.5	2	2	2								ALLUVIUM: DARK GREY SANDY CLAY WITH GRAVEL, MOI. TO WET	
2,099.9	9.4	2	1	1								SAPROLITE: GREY TO TAN SILTY SAND WITH TRACE MICA, SAT.	8.0
2,094.8	14.5	4	4	3									
2,089.8	19.5	2	2	3									
2,084.8	24.5	3	3	6									
2,079.8	29.5	8	64	100/4								WEATHERED ROCK OF GNEISS	30.5
2,074.8	34.5	50/4											
2,069.8	39.5	50/3											
												CRYSTALLINE ROCK OF GNEISS TOTAL REC = 87% TOTAL RQD = 71%	44.5
													2,056.4
												Boring Terminated at Elevation 2,056.4 ft IN CRYSTALLINE ROCK OF GNEISS	52.9

NCDOT BORE SINGLE R4430 GEO BRDG Y10 .GPJ NC_DOT_GDT 6/19/08

PROJECT NO. 34623.1.1	ID. R-4430	COUNTY Henderson	GEOLOGIST Daniel, T. B.
SITE DESCRIPTION BRIDGE 162 ON SR-1783 (UPWARD RD.) OVER I-26 (-Y10-)			GROUND WTR (ft)
BORING NO. B1-B	STATION 93+48	OFFSET 35ft RT	ALIGNMENT L
COLLAR ELEV. 2,109.3 ft	TOTAL DEPTH 52.9 ft	NORTHING 580,580	EASTING 983,606
DRILL MACHINE CME-550	DRILL METHOD NW Casing w/ SPT Core	HAMMER TYPE Automatic	
START DATE 11/08/05	COMP. DATE 11/09/05	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 44.5 ft

ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
				REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2064.75											
2,064.8	44.5	3.4		(3.2) 94%	(2.6) 76%					Begin Coring @ 44.5 ft	44.5
2,061.4	47.9	5.0		(4.1) 82%	(3.4) 68%	RS-2				LIGHT GREY GRANITE GNEISS. MODERATELY TO SLIGHTLY WEATHERED. MODERATELY HARD WITH MEDIUM HARD ZONES FROM 47.4 TO 48.4 AND 49.2 TO 49.6 FEET.	
										OCCASIONAL PARTS ALONG FOLIATION AT 10 DEGREES.	
2,056.4	52.9									Boring Terminated at Elevation 2,056.4 ft IN CRYSTALLINE ROCK OF GNEISS	52.9

NCDOT CORE SINGLE R4430 GEO BRDG Y10 .GPJ NC_DOT_GDT 6/19/08

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.						
SITE DESCRIPTION BRIDGE 162 ON SR-1783 (UPWARD RD.) OVER I-26 (-Y10-)						GROUND WTR (ft)						
BORING NO. EB2-B		STATION 94+76		OFFSET 67ft RT		ALIGNMENT L						
COLLAR ELEV. 2,107.9 ft		TOTAL DEPTH 57.9 ft		NORTHING 580,563		EASTING 983,737						
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT Core		HAMMER TYPE Automatic								
START DATE 11/10/05		COMP. DATE 11/14/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 50.8 ft						
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75				
2110												2,107.9 GROUND SURFACE 0.0
												EMBANKMENT: TAN SILTY SAND, DRY
2,103.5	4.4	4	3	3								2,102.4 5.5
												ALLUVIUM: DARK GREY SLIGHTLY ORGANIC SANDY SILT WITH TRACE MICA, MOI. TO WET
2,098.5	9.4	5	4	6								2,097.9 10.0
												SAPROLITE: BROWN SILTY SAND, SAT.
2,093.5	14.4	2	2	2								
2,088.5	19.4	3	4	5								
2,083.5	24.4	3	4	4								
2,078.5	29.4	6	11	14								
2,073.5	34.4	22	40	61/1								2,072.9 35.0
2,068.5	39.4	34	52	48/2								WEATHERED ROCK (GNEISS)
2,063.5	44.4	50/1										2,057.1 50.8
												CRYSTALLINE ROCK (GNEISS)
												TOTAL REC. = 77%
												TOTAL RQD = 77%
												2,050.0 57.9
												Boring Terminated at Elevation 2,050.0 ft IN CRYSTALLINE ROCK OF GNEISS

NCDOT BORE SINGLE R4430 GEO BRDG Y10 GPJ NC_DOT.GDT 6/19/08

PROJECT NO. 34623.1.1		ID. R-4430		COUNTY Henderson		GEOLOGIST Daniel, T. B.					
SITE DESCRIPTION BRIDGE 162 ON SR-1783 (UPWARD RD.) OVER I-26 (-Y10-)						GROUND WTR (ft)					
BORING NO. EB2-B		STATION 94+76		OFFSET 67ft RT		ALIGNMENT L					
COLLAR ELEV. 2,107.9 ft		TOTAL DEPTH 57.9 ft		NORTHING 580,563		EASTING 983,737					
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT Core		HAMMER TYPE Automatic							
START DATE 11/10/05		COMP. DATE 11/14/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 50.8 ft					
ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
				REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2057.12											Begin Coring @ 50.8 ft
2,057.1	50.8	2.1		(0.6)	(0.6)						2,057.1 50.8
2,055.0	52.9	5.0		(4.9)	(4.9)						HARD, GREY, FRESH GRANITE GNEISS WITH OCCASIONAL LAYERS OF GREY, SOFT, SLIGHTLY WEATHERED BIOTITE GNEISS (PARTS EASILY ALONG FOLIATION)
				98%	98%						
2,050.0	57.9					RS-3					2,050.0 57.9
											Boring Terminated at Elevation 2,050.0 ft IN CRYSTALLINE ROCK OF GNEISS

NCDOT CORE SINGLE R4430 GEO BRDG Y10 GPJ NC_DOT.GDT 6/19/08

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34505.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.1.05	DATE RECEIVED:	11.1.05	DATE REPORTED:	11.7.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-34	SS-35	SS-36	SS-37				
Lab Sample No. A	150969	150970	150971	150972				
HiCAMS Sample #	--	--	--	--				
Retained #4 Sieve %	--	--	--	--				
Passing #10 Sieve %	77	81	76	97				
Passing #40 Sieve %	66	72	66	75				
Passing #200 Sieve %	34	40	32	23				

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	24	21	27	40				
Fine Sand - Ret. #270	39	38	36	43				
Silt 0.05-0.005 mm %	25	23	27	15				
Clay < 0.005 mm %	12	18	10	2				
Passing # 40 Sieve %	--	--	--	--				
Passing # 200 Sieve %	--	--	--	--				

Liquid Limit	38	32	39	35				
Plastic Index	NP	NP	NP	NP				
AASHTO Classification	A-2-4 (0)	A-4 (1)	A-2-4 (0)	A-2-4 (0)				
Quantity								
Texture								
Station	94+48	94+48	94+48	94+48				
Hole No.								
Depth (ft) From:	4.6	14.6	29.6	34.6				
To:	6.1	16.1	31.1	36.1				

Remarks:

A-150969 - 150972

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.3.05	DATE RECEIVED:	11.4.05	DATE REPORTED:	11.10.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-38	SS-39	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45
Lab Sample No. A	151019	151020	151021	151022	151023	151024	151025	151026
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	98	100	98	100	97	98	97	97
Passing #40 Sieve %	86	97	93	92	72	89	79	86
Passing #200 Sieve %	35	35	25	21	22	33	24	28

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	27	14	21	25	44	21	34	24
Fine Sand - Ret. #270	45	64	62	63	40	57	50	57
Silt 0.05-0.005 mm %	16	18	15	10	14	20	14	17
Clay < 0.005 mm %	12	4	2	2	2	2	2	2
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	43	41	42	43	36	35	38	35
Plastic Index	NP							
AASHTO Classification	A-2-5 (0)	A-2-5 (0)	A-2-5 (0)	A-2-5 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	91+75	91+75	91+75	91+75	91+75	91+75	91+75	91+75
Hole No.								
Depth (ft) From:	4.5	9.5	14.5	19.5	24.5	29.5	34.5	39.5
To:	6.0	11.0	16.0	21.0	26.0	31.0	36.0	41.0

Remarks:

A-151019 - 151026

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.3.05	DATE RECEIVED:	11.4.05	DATE REPORTED:	11.10.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-46						
Lab Sample No. A	151027						
HiCAMS Sample #	--						
Retained #4 Sieve %	--						
Passing #10 Sieve %	94						
Passing #40 Sieve %	77						
Passing #200 Sieve %	28						

MINUS #10 FRACTION

Soil Mortar - 100%							
Coarse Sand -Ret. #60	30						
Fine Sand - Ret. #270	48						
Silt 0.05-0.005 mm %	18						
Clay < 0.005 mm %	4						
Passing # 40 Sieve %	--						
Passing # 200 Sieve %	--						

Liquid Limit	34						
Plastic Index	NP						
AASHTO Classification	A-2-4 (0)						
Quantity							
Texture							
Station	91+75						
Hole No.							
Depth (ft) From:	44.5						
To:	46.0						

Remarks:
 A-151027

CC:
 C. A. Dunnagan
 File

SOILS ENGINEER:

JCS
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.8.05	DATE RECEIVED:	11.10.05	DATE REPORTED:	11.21.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-47	SS-48					
Lab Sample No. A	151099	151135					
HiCAMS Sample #	--	--					
Retained #4 Sieve %	--	--					
Passing #10 Sieve %	90	89					
Passing #40 Sieve %	74	74					
Passing #200 Sieve %	45	37					

MINUS #10 FRACTION

Soil Mortar - 100%							
Coarse Sand -Ret. #60	28	30					
Fine Sand - Ret. #270	26	33					
Silt 0.05-0.005 mm %	22	27					
Clay < 0.005 mm %	24	10					
Passing # 40 Sieve %	--	--					
Passing # 200 Sieve %	--	--					

Liquid Limit	32	37					
Plastic Index	12	NP					
AASHTO Classification	A-6 (3)	A-4 (0)					
Quantity							
Texture							
Station	93+48	94+76					
Hole No.							
Depth (ft) From:	4.5	5.4					
To:	6.0	5.9					

Remarks:
 A-151099 & 151135

CC:
 C. A. Dunnagan
 File

SOILS ENGINEER:

6/25/2008
NC DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS UNIT
RockCore

MEMORANDUM
C A Dunnagan Field office-Geototechnical Eng. Unit
Chris Chen, technical Support Supervisor
Steve Wirth technical Support

J. A. Habib (Physical Testing Laboratory)
919-329-4128

FROM:

Rock Core Results

SUBJECT:

Laboratory No.: P-321198
STATE PROJECT: 34823.1.1
TIP No.: R-4430
COUNTY: Henderson
DESCRIPTION: Br. On-L-(SR 17.3) over Y10_(I-26)

UNIT WEIGHT
COMPRESSIVE STRENGTH
YOUNG MODULUS (E)
POISSONS RATIO (v)

	<i>L</i>	<i>D</i>	<i>P</i>	
Sample No	Thickness	Diameter	Maximum Load	Tensile Strength
RS-1	0.944	1.865	1765	638
RS-2	0.974	1.865	1210	424
RS-3	0.904	1.865	855	323

The split tensile test was done parallel to the grain because a portion of the rock perpendicular to the grain was damaged

Graph may not be representative of the ultimate load. The strain gage has to be removed before the ultimate load is achieved.

SAMPLES WILL BE HELD FOR 30 DAYS UNLESS OTHERWISE NOTIFIED. THANK YOU.

Splitting Tensile Strength of Intact Rock Core Specimens
ASTM D 3967

North Carolina Dept. of Transportation
 Division of Highways
 Materials and Tests
 Physical Testing Laboratory

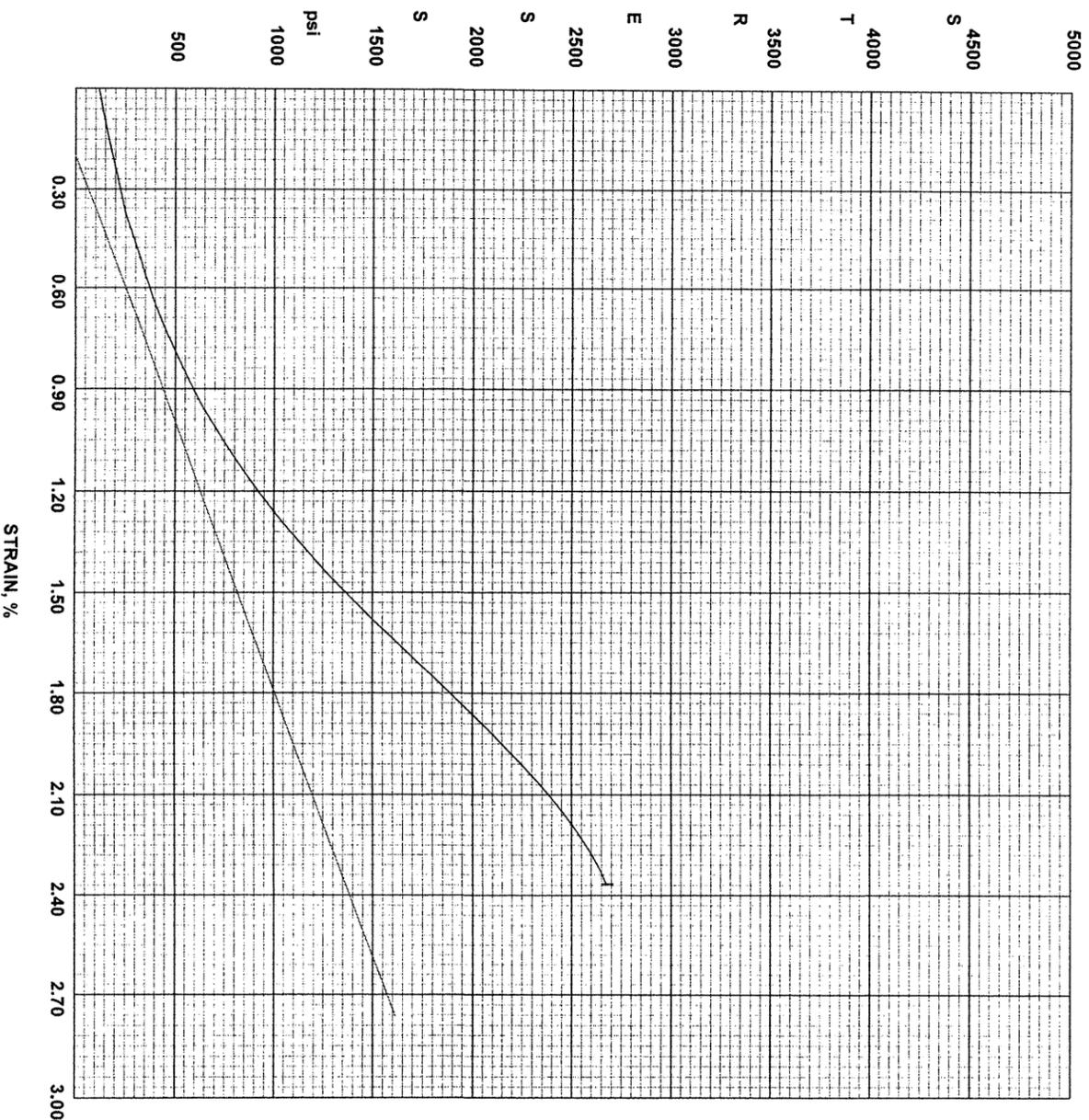
Rock Compression

Lab Number 321198
 Project # 34623.1.1
 County HENDERSON
 Tip ID R-4430

Structure Description Br. on L-(SR1783)
 over-Y10-(I-26)
 Test Date 11/18/2005

Lab Number: 321198
 Sample No.: RS-2
 Diameter, in: 1.8650
 Area, in²: 2.7318
 Depth: 0.0000
 Specimen, in: 3.65
 H/D Ratio: 1.955
 Weight, lbf: 0.8900
 Unit Weight, lbf/#3: 154.4
 Ultimate, lbf: 7400
 Ultimate, ksi: 2.71
 Ultimate, ksi: 0.281
 40% Ult. Load, lbf: 2960
 Sec Mod @ 40%, Mpsi: 0.006554

Nov 18, 2005 8:46:17 AM
 SN: 205692-R1 V7.02.00



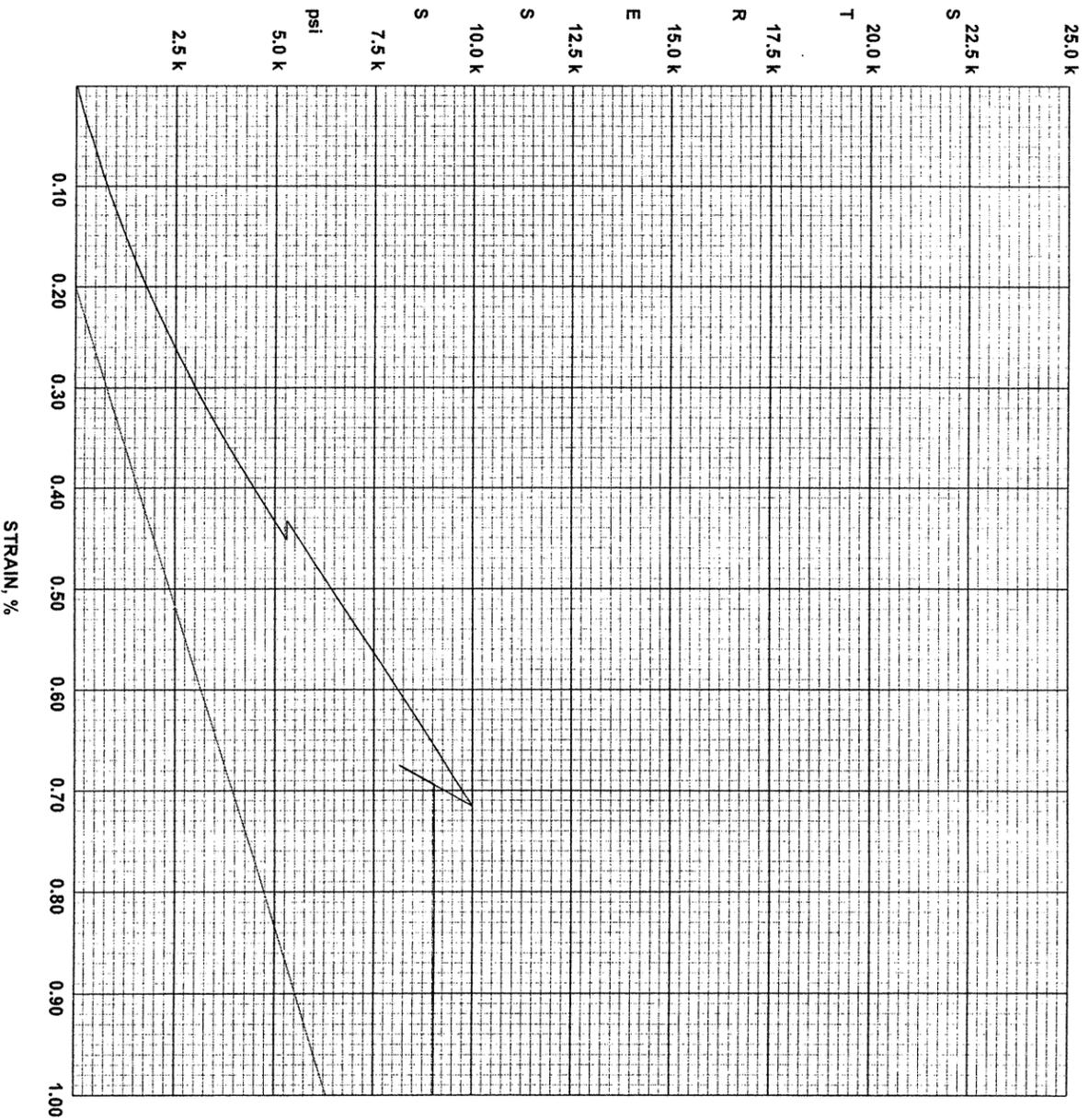
North Carolina Dept. of Transportation
 Division of Highways
 Materials and Tests
 Physical Testing Laboratory

Rock Compression

Lab Number 321198
 Project # 34623.1.1
 County HENDERSON
 Tip ID R-4430

Structure Description Br. on L-(SR1783)
 over-Y10-(I-26)
 Test Date 11/18/2005

Lab Number: 321198
 Sample No.: RS-1
 Diameter, in: 1.8650
 Area, in²: 2.7318
 Depth: 0.0000
 Specimen, in: 4.1
 H/D Ratio: 2.2
 Weight, lbf: 1.0400
 Unit Weight, lbf/#3: 160.3
 Ultimate, lbf: 29100
 Ultimate, ksi: 10.66
 Ultimate, ksi: 1.246
 40% Ult. Load, lbf: 11650
 Sec Mod @ 40%, Mpsi: 0.1285



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**North Carolina Dept. of Transportation
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Materials and Tests
Physical Testing Laboratory**

Rock Compression

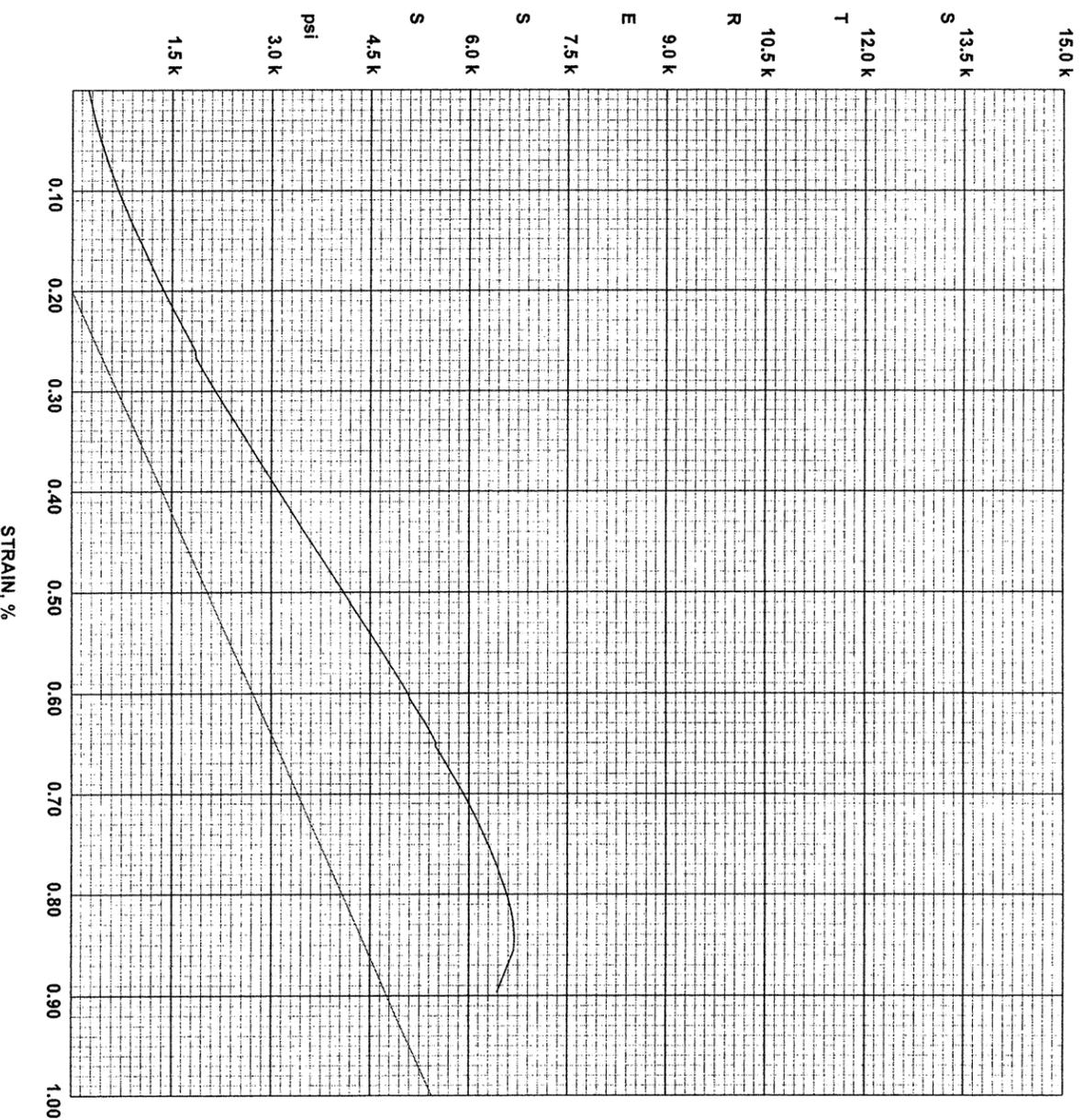
Lab Number:
Project #:
County:
Tip ID:

321198
34623.1.1
HENDERSON
R-4430

Structure Descriptio:
Test Date:

Br. on -L-(SR1783) ove...
11/18/2005

Lab Number	Sample No.	Diameter in	Area in ²	Depth	Specimen Height in	H/D Ratio	Weight lbf	Unit Weight lbf/ft ³	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	40% Ult. Load lbf	Sec Mod @ 40% Mpsi
321198	RS-1	1.8650	2.7318	0.0000	4.1	2.2	1.0400	160.3	29100	10.66	1.246	11650	0.1285
321198	RS-2	1.8650	2.7318	0.0000	3.65	1.955	0.8900	154.4	7400	2.71	0.281	2950	0.00654
321198	RS-3	1.8650	2.7318	0.0000	4.13	2.22	1.0600	162.2	18280	6.69	0.788	7310	0.0741



**North Carolina Dept. of Transportation
Division of Highways
Materials and Tests
Physical Testing Laboratory**

Rock Compression

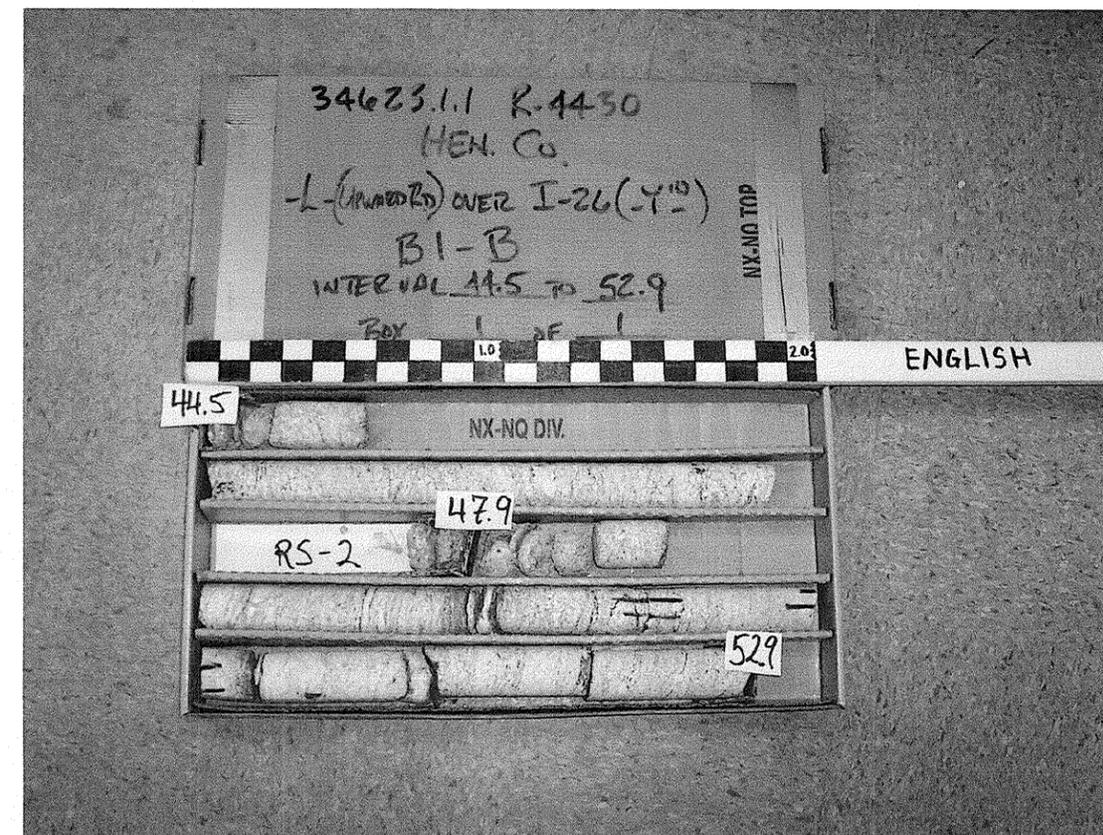
Lab Number: 321198
Project #: 34623.1.1
County: HENDERSON
Tip ID: R-4430

Structure Description: Br. on -L-(SR1783)
over-Y10-(I-26)
Test Date: 11/18/2005

Lab Number: 321198
Sample No.: RS-3
Diameter, in: 1.8650
Area, in²: 2.7318
Depth: 0.0000
Specimen, in: 4.13
H/D Ratio: 2.22
Weight, lbf: 1.0600
Unit Weight, lbf/ft³: 162.2
Ultimate, lbf: 18280
Ultimate, ksi: 6.69
Ultimate, ksi: 0.788
40% Ult. Load, lbf: 7310
Sec Mod @ 40%, Mpsi: 0.0741

17/19

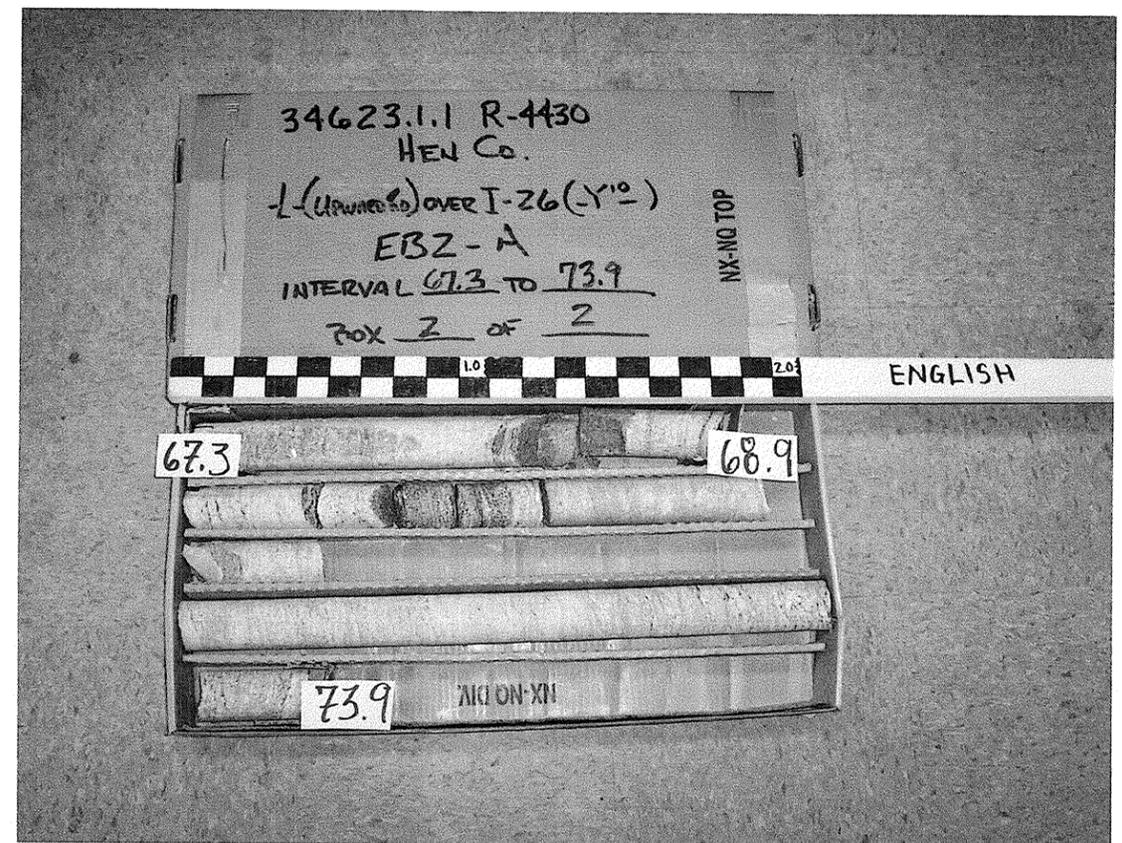
34623.1.1 HENDERSON Co. Br. 162 on SR-1783 (Upward Rd.) over I-26 (-Y10-)
B1-B 93+48 -L- 35 Rt.



34623.1.1 HENDERSON Co. Br. 162 on SR-1783 (Upward Rd.) over I-26 (-Y10-)
EB2-A1 94+48 -L- 22 Lt.



34623.1.1 HENDERSON Co. Br. 162 on SR-1783 (Upward Rd.) over I-26 (-Y10-)
EB2-A2 94+48 -L- 22 Lt.



34623.1.1 HENDERSON Co. Br. 162 on SR-1783 (Upward Rd.) over I-26 (-Y10-)
EB2-B 94+76 -L- 67 Rt.

